Hyperammonemic Conditions Affects Astroglial Activity in Acute Hippocampal Slices of Wistar Rats.


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The excess of ammonia, caused by liver failure or inborn error of the urea cycle, accumulates to toxic levels in the brain, resulting in molecular and physiological changes. These changes are associated with neuropsychiatric abnormalities as hepatic encephalopathy (HE). S100B is a protein, mainly expressed by astrocytes in central nervous system (CNS), which is significantly increased in serum of rats submitted to HE model and in patients with fulminate hepatitis. However, the origin S100B in serum is not exclusively from CNS, because adipocytes can also secrete S100B in the peripheral nervous system (PNC). The aim of this study was to investigate the effect of ammonia on acute hippocampal slices analyzing the extracellular content of S100B, intracellular content of glutathione (GSH) and glutamate uptake. Hippocampal slices were stabilized in BSS/HEPES buffer for 2 h. The medium was replaced and ammonia at 0.1-1 mM was added for 1 h. S100B measurement was carried out by ELISA, GSH content was measured by a fluorimetric assay and glutamate uptake was measured by $[^3H]$ radiometric assay. Cell viability was assessed by LDH release and MTT reduction assay. Ammonia was able to reduce S100B secretion, GSH content and glutamate uptake. These results indicate that hippocampus S100B secretion may not be related to the increase in S100B serum observed in patients with hyperammonemia, but could be related to cognitive impairment observed in these patients. The reduction in intracellular GSH and in glutamate uptake could be indicative of oxidative stress and extracellular accumulation of glutamate causing an excitotoxic effect.

Word Keys: Hyperammonemia, S100B, ammonia, hippocampal slices

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